

An Introduction to Usability

Teal Anderson
February 8, 2005
Welch Library

Overview

- What is usability?
- Why is usability evaluation important?
- What are the standard usability evaluation methods?
- What decisions have to be made to use these evaluation methods?
- Case study

Defining usability

- Measurable characteristic
 - Ease of learning, use, and remembering
 - Effectiveness
 - Satisfaction
- Practice
 - Learn about your users: Who are they and what are their goals?
 - Observe users interacting with the system

Why usability is important

- Good user experience depends on good usability
- Financial implications
 - Repeat users
 - Cost of redesigning late in development
 - Support/Help desk use
- “If the user can’t use it, it doesn’t work!”
 - Susan Dray

Usability Methods

- Heuristic Evaluation
- Online Survey
- Focus Groups
- Card-Sorting
- Link-Naming
- Contextual Inquiry
- Scenario-Based Think-Aloud Tests

Heuristic evaluation: Compare the site to established guidelines, e.g. consistency, clarity, simplicity. Doesn't involve end user, but most methods do.

Online survey and focus groups: Learn how people currently work by asking them questions; Ask what they would like to see changed and what they like. Don't plan to talk much about these methods here, since this course covers user needs (interviews) and user satisfaction (surveys) in other sessions.

Card-sorting: To structure and group items. Ask participants to group link names or page descriptions.

Link-naming: Terminology - ask people what they expect. Then, ask what they would call the link to that page.

Contextual Inquiry: Watch real users doing what they're doing. (AKA field observation or naturalistic observation)

Scenario-based think-aloud tests: Watch actual users using site, but in controlled setting, with specified tasks.

Concepts Across Methods

- Iterative testing
- Dealing with participants
 - Institutional Review Board clearance
 - Recruitment
 - Timing
 - Incentives
 - Demographic information
 - Number of participants
- “Discount” approach

Iterative testing: mock-up site, test, re-design site, test, re-design site, etc.

Institutional Review Board approval needed for any “research” with “human subjects”. Not many risks, but still need a good consent form.

Recruitment: Posters, list mail, announcements in class. Link on web site.

Timing: Hold while classes are in session, not near exams.

Incentives: \$10-\$15 gift certificates for library coffee shop or online bookstore - enough to recruit students, but not particularly effective for recruiting faculty. If sessions are short, offer a chance at a gift certificate or another prize in a drawing.

Demographic information: pre- or post-test survey to collect information about how frequently they use the web and the resource we’re testing, what is their area of study, what is their home library.

How many participants are needed? “It depends”

Discount approach: because trying to make usability testing a realistic goal for libraries, don’t invest in expensive equipment. But, don’t buy into Nielsen’s “5 users is enough” school of thought. (We have too many diverse user groups for most of our tests)

Heuristic Evaluation

- Which heuristics to use?
- Which pages to evaluate?
- Who will evaluate?
- How will results be collected and organized?

Which heuristics: Jakob Nielsen's 10 usability heuristics and Keith Instone's adaptation of them for the Web. A good place to start, but these are rather general. Usability.gov is more specific. (Will provide references two slides from now.)

Which pages: How many levels of the site will be evaluated? Will you just evaluate one section of the site? If so, what are the implications for other sections if you find out that the global navigation bar violates a usability heuristic?

Who will evaluate: Should have several people learn about usability heuristics and conduct heuristic evaluations individually, then compare results. Good for designer to learn about usability and to employ usability principles in design, but probably will have a hard time evaluating own designs.

How to collect and organize results: Individual looks at a page, checks off which heuristics are violated, and writes a description of the problem and what could be done to fix it. Agree on a reporting format - by page or by heuristic. Prioritize problems by "severity" - how many times does this problem occur across the site, how problematic would it be for users each time it is encountered? Try to fix "severe" problems first.

Sample Heuristics

- Be Consistent
- Be Concise
- Minimize Memory Load

Consistent: Page titles, page headings, and link names. Use of terminology. Locations of features on the page.

Concise: Short sentences are better than long sentences. Short paragraphs are better than long paragraphs. “Chunk” information but also allow user to choose to see a lot of information at the same time (if they would prefer to scroll rather than hit ‘next,’ or if they would prefer to print out a whole article/chapter instead of one page at a time). Being concise is especially important for instructions. Many people do not read paragraphs of instructions - bulleted points or numbered steps for a process are better.

Minimize memory load: Make options visible where user needs to make a choice.

Heuristics Resources

- Instone, Keith. "Site Usability Heuristics for the Web." user-experience.org/uefiles/writings/heuristics.html
- Nielsen, Jakob. "Ten Usability Heuristics." www.useit.com/papers/heuristic/heuristic_list.html
- National Cancer Institute. "Research-Based Web Design & Usability Guidelines." www.usability.gov/guidelines/

Card-Sorting

- Where, how long?
- Which links to include?
- Require naming of groups?
- How to collect the data?
- How to do a cluster analysis?

Where, how long: Need a big table unless collecting data online. Length of sessions varies greatly among participants, and according to how many links are included.

Which links: Number of links has great effect on how long the sessions take. Generally, all links on 1 page that you want to reorganize is a good set of links for one round of card-sorting.

Require naming? Outside of the cluster analysis data, but an interesting addition. Extra clue to why participant grouped those links together.

How to collect data: Physical cards - ask participants to arrange in piles, secure the piles (rubber bands vs. paper clips). Write group names on sticky notes. Then have to enter the data. Online sorting - participants move link names to different 'bins' on screen. Data entry is automatic.

How to do cluster analysis: Do the math by hand or use a card-sorting tool - which one? (see next slide)

Card-Sorting Tools

- EZSort (USort and EZCalc from IBM)
- WebCAT (NIST Web Metrics Testbed)
- WebSort (tool can be licensed from www.websort.net)
- uzCardSort (Mozilla-based open source tool)

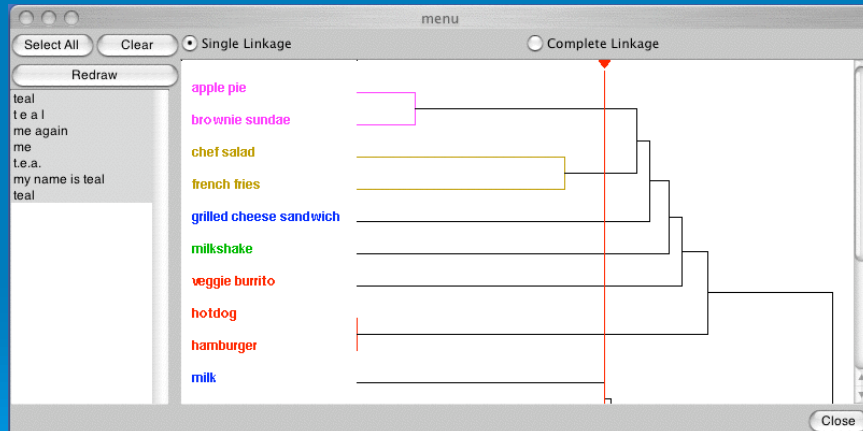
EZSort: we had trouble getting this to run.

We've had the most success with WebCAT, but even that has taken some wrangling, and we've found bugs.

WebSort seems nifty, but it's expensive.

uzCardSort for Mozilla browser.

Sample Cluster Analysis



This tree structure is the result of a cluster analysis performed on a demo card-sort of menu items. The tree structure and the colors show that many participants put apple pie and brownie sundae in the same group, more than put chef salad or french fries with apple pie or brownie sundae. However, these four were put in the same group more often than any of these four items were put in the same group as a grilled cheese sandwich. Items that were put in the same group most frequently are the same color, and they are "closer" in the tree structure. (A close look reveals a WebCAT bug: hotdog and hamburger are close in the tree structure and therefore should be the same color. Veggie burrito is not very close to hotdog and hamburger, and therefore should not be the same color.)

Link-Naming

- Where, how long?
- Which links to include?
- How to collect the data?

Where, how long: Don't need big space, but need access to the site.

Which links: Affects how long the session will be. Can be the same as card-sorting (all one page), or can focus on "problem links" from across the site.

How to collect data: Write down notes.

Random order of presentation of links - ideal but hard to do.

On paper vs. on screen (links with and without context of rest of page): we haven't seen a difference so far.

Two phases: (1) What would you expect if you clicked on this link? (2) Was this what you expected, and what would you call the link to this page?

Contextual Inquiry

- When, where, how long?
- What data to collect and how?

When, where, how long: Whenever it's convenient for the participant. Whenever they'll be using your site. In their office, or in the computer lab. Plan on 30-60 minutes of observation plus some time for follow-up questions.

What data to collect and how: Take good notes on what they're doing. Consider audio-taping comments.

Scenario-Based Think-Aloud Tests

- Where, how long?
- How to design the tasks?
- What data to collect and how?

Where, how long: Quiet room with access to site & space for facilitator and note-taker/observer. Plan on 60 to 90 minutes.

How to design the tasks: What are users known to have problems doing? (Consult help desk.) What tasks do you want people to be able to do? Scenario and request to do something in that situation. Avoid naming the key links they'll need to follow in the task.

What data to collect and how:

pen & paper/laptop note-taking

audiotapes for comments (Some people do more thinking aloud than others)

videotapes for facial expressions

screen-capture for mouse movements/link selection/search terms

eye-tracking to see where participants look

time - how long did it take participants to complete each task?

task success - how many participants successfully completed each task? (Need to define what constitutes task success!)

Case Study: ARTstor

- www.artstor.org
- 300,000 images of art, architecture, archaeology in charter collection
- Mission: “To enable the use of digital technology to enhance scholarship, teaching and learning in the arts and associated fields.”
- Core audience: scholars, students, educators, libraries, museums

Scenario-based, think-aloud testing of ARTstor

- 30 Participants:
 - Faculty, graduate students, undergraduate students, museum staff from six institutions
 - Art history and other fields of study
- Scenarios to evaluate usability of search, browse, and user-defined collection functions

ARTstor is growing all the time as collections are added; 150,000 images at the time of the testing and goal is 500,000 in 2005.

An example of the use of ARTstor is for faculty to be able to project images using ARTstor during class, and give students access to those images throughout the semester.

Logistics

- Multiple locations
- Various institutional review board processes
- Arrangement of testing rooms
- Participant recruitment and incentives
- Instructions
- Recording test sessions

Locations: Johns Hopkins University, James Madison University, Princeton University, Williams College, JHU - local museum staff

IRB: filed with each institutional IRB; each institution had a different process, varying levels of work and approval required.

Rooms: PC with Internet access and access to ARTstor, quiet, room for note-taker & facilitator & participant

Recruitment: mass e-mails to students; references from art history librarian, slide librarians, art history contacts

Incentives: \$15 Amazon.com gift certificate (the “going rate” for an hour of students’ time has gone from approx. \$10 to \$20 over the last 5 years.)

Instructions: Think aloud. Can’t answer questions until after the session. Consent form. Test of ARTstor, not of participant.

Recording: Audiotape captures comments. Note-taker also focuses on comments. Use notes as primary source and audiotape as backup. Facilitator takes notes on actions.

Test Design

- Task development
 - Basic functionality of ARTstor
 - Scenarios
 - Careful wording
- Timing
 - Allowed 90 minutes for 1-hour session
 - Added tasks when found sessions running 30-40 minutes

ARTstor had basic tasks in mind: navigation, searching/browsing, viewing image details and data, comparing 2 images side-by-side, saving groups, viewing groups, registering, using help

Scenarios: E.g., “You are an anthropology professor teaching a course on Native American culture. You use slides in teaching and would like to refer some of your students to ARTstor for independent study after class, so you are seeking images of pottery. You choose to search in the Carnegie collection. Create an image group of Native American Pottery.”

Wording: E.g., “Indian Art” is a category in the Carnegie collection. We asked participants to find “Native American pottery” so as to avoid leading the participants.

Analysis

- Added number of successful participants for each key aspect of a task, e.g. Did participants find images of pottery? Were they Native American? Were they from the Carnegie collection?
- Calculated average number of links followed on some tasks, e.g. Getting from the ARTstor homepage to the library homepage
- Quantified use of features not expected to be used during tasks

Qualitative and quantitative data (comments and spreadsheet)

We created an Excel spreadsheet that recorded 1's and 0's for "yes" and "no" answers to questions that we asked while looking at how participants completed each task. For example, for the task that asked participants to find images of Native American pottery from the Carnegie collection, we looked at our transcripts to tally how many participants found images of pottery, how many found images of Native American art, and how many found images from the Carnegie collection.

For some tasks, we counted the number of links participants followed, and we calculated the average. For example, for the first task, we counted how many links participants clicked on before they clicked on the "Enter the Library" link.

We also tallied participants' success in using features that were not specifically dealt with in the tasks, but that some participants happened to use in the course of the session. For example, we counted how many participants tried the List Images and Sort features, how many participants discovered that the ARTstor logo is a link to the library homepage, and, of those who tried, how many were successful in deleting an image from an image group that they had created.

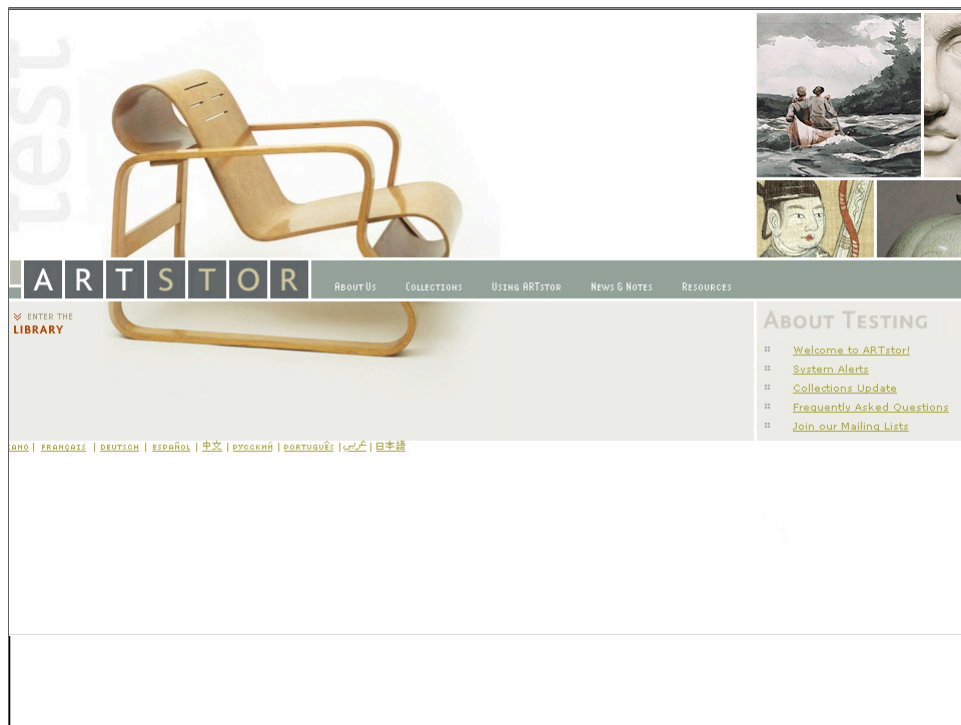
Results: a few examples

- ARTstor Homepage
- Library Homepage
- Thumbnail Page (search results)
- Advanced Search
- Help

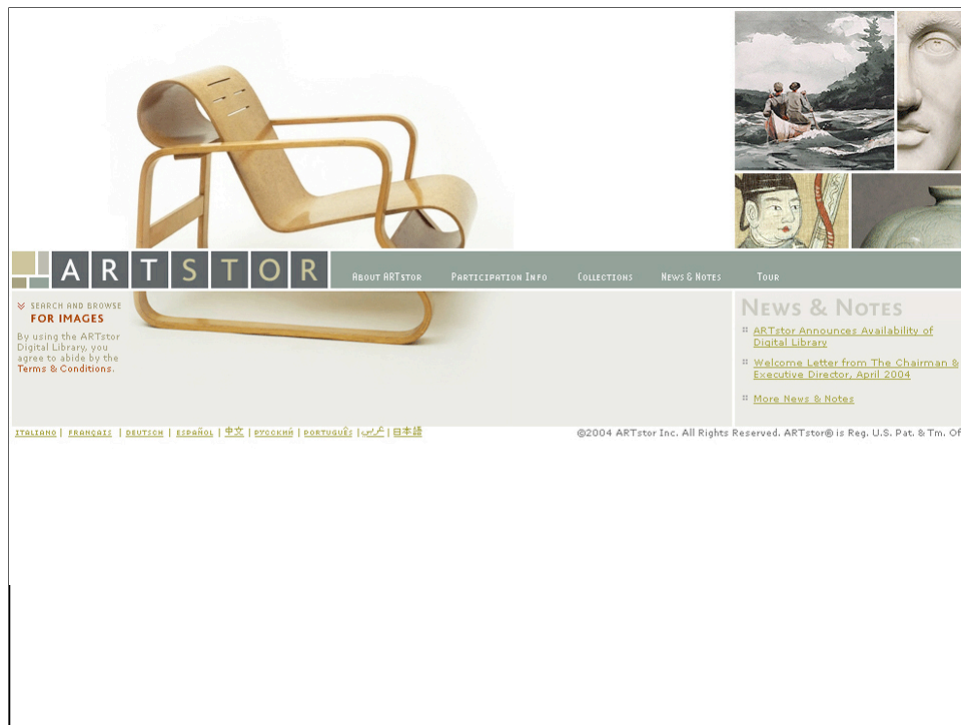
Want to show before and after screenshots to illustrate some of the challenges that participants encountered during the sessions and how some of the changes that we recommended have been implemented.

ARTstor Homepage

- We found that many participants had a hard time navigating to where they could search for images.



Many users went to “Collections” link, thinking they could search the database there. The “Enter the Library” link, which is the entry point to searching and browsing for images, was cited as not prominent enough on the page.



On the revised homepage, “Search and Browse for Images” replaces the link “Enter the Library.”

In addition, “Search and Browse for Images” links have been added in many places on the ARTstor web site. Thus, even if users miss the “Search and Browse for Images” link on the ARTstor homepage and select the “Collections” link, they will find links to searching and browsing next to and below all of the collection descriptions.

Library Homepage

- A few minor changes were made to the arrangement of collections and the items on the navigation bar.
- Many users were asked to find an image of a teapot as their first search task.
- This is where users wanted to return to initiate a new search.

ARTSTOR

My Image Groups Advanced Search

Utilities Help Logon

THANK YOU FOR USING ARTSTOR

We are currently in a test phase and appreciate your patience and comments as we continue to develop our collections and tools.

If you want to be able to make full use of ARTstor, you will need to register through a very simple process.

Registration permits you not only to search and browse the ARTstor collections, but also to save image groups for later consultation, and to print and download high resolution images for permitted uses.

If you are unaffiliated with this institution, you may not register but are still welcome to search and browse the ARTstor collections.

KEYWORD SEARCH

VIEW IMAGE GROUPS

Select a course folder

Select an image group


REGISTER / LOGON

Need to register?

Already registered?

Lost password?

BROWSE COLLECTIONS




WORLD ART

The Image Gallery

A deep and broad collection of images of world art, architecture, and visual art

Art History Survey Collection

Key monuments of world art



ART OF EUROPE AND AMERICA

Carnegie Arts of the United States

American Art, Architecture, and visual culture from Colonial to 20th Century


The Illustrated Bartsch

European prints from the Renaissance to the 19th Century

Museum of Modern Art

Architecture and Design Collection

20th Century design



ART OF ASIA

Mellon International Dunhuang Archive

Rich documentation of the important Buddhist cave shrines at the Dunhuang oasis site on the Ancient Silk Route.

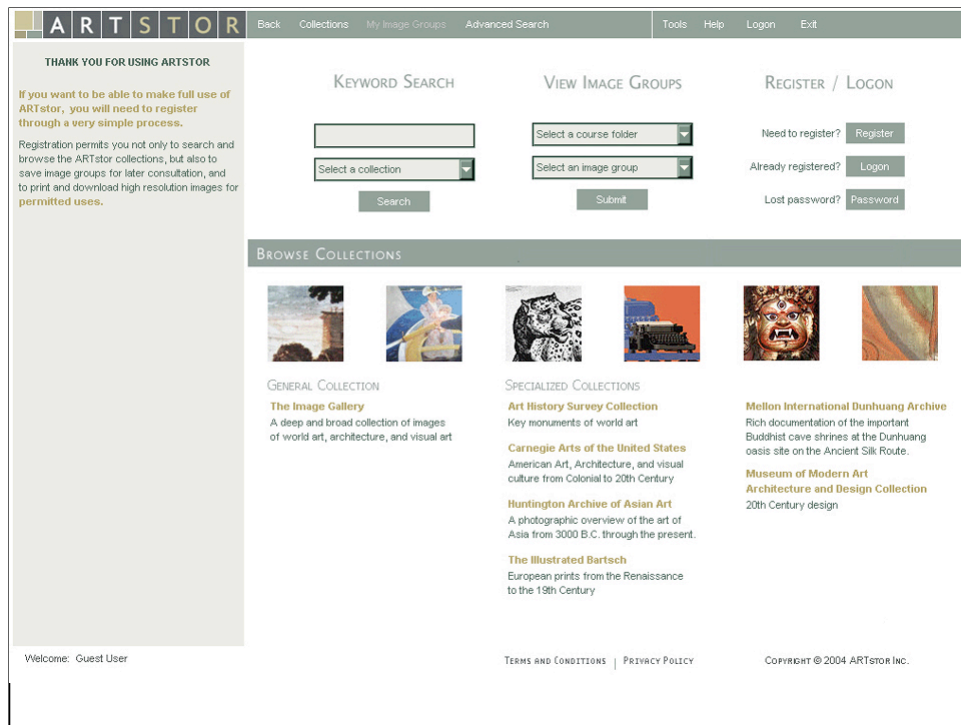
Welcome: Guest User

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Grayed out “My Image Groups” - good because not logged in yet and can’t use it until logged in

“Utilities” changed to “Tools”

Added “Back” link will help users access prior searches

Added “Exit” link

“General Collection” and “Specialized Collections” are clearer categories of collections than geographic categories (more in line with academic coursework - e.g. General Collection for survey courses)

Thumbnail Page
















- Navigation bar changes
 - Back button on bar instead of hidden under “Go To” button
 - Home button
 - Removed inactive Save button
- Search could be changed to another collection with added drop-down list of collections

ARTSTOR
Collections
Image Groups
List Images
Browse Collection
Advanced Search
Utilities
Help
Logout
Shortcuts
Clear
Save

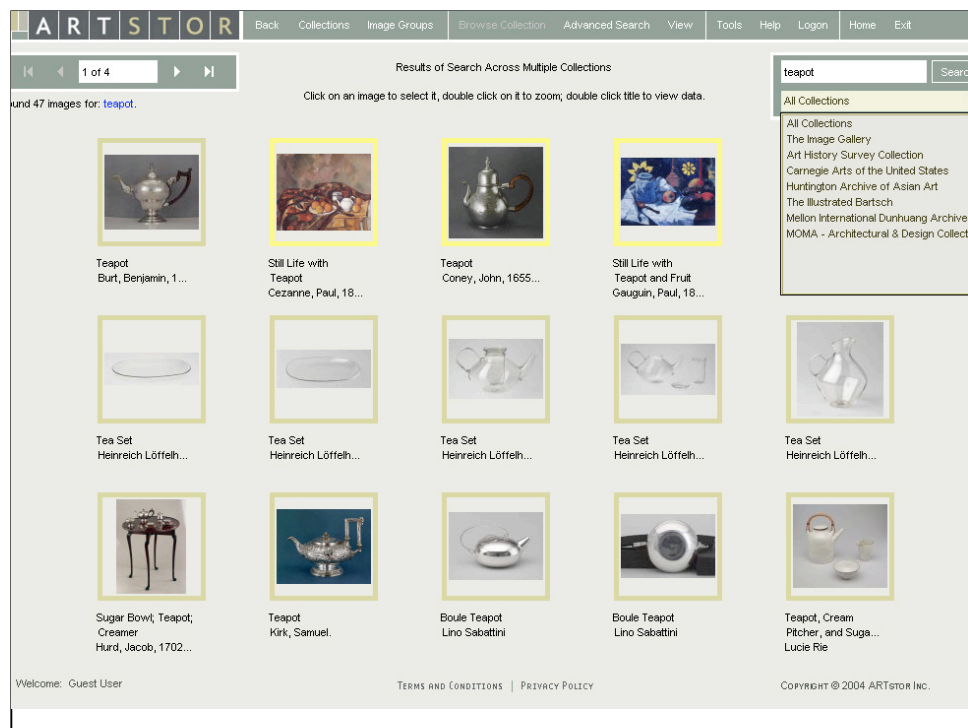
1 of 3
Results of Search Across Multiple Collections
teapot
Search
All Collections
Selected Collections

and 34 image(s) while searching for: [teapot](#).

Click on an image to select it, double click on it to zoom, double click title to view data.

 <p>Teapot.</p>	 <p>Teapot</p>	 <p>Teapot.</p>	 <p>Bowl, Teapot, Water Pot, Creamer, Sugar Bowl, Richardson, Joseph...</p>	 <p>Teapot Coney, John, 1655...</p>
 <p>Teapot Van Dyke, Peter, ...</p>	 <p>Teapot Van Dyke, Peter, ...</p>	 <p>Sugar Bowl and Teapot Richardson, Joseph...</p>	 <p>Teapot Taylor, Najah.</p>	 <p>Teapot Kirk, Samuel.</p>
 <p>Teapot</p>	 <p>Dinnerware Heath, Edith, 1911-</p>	 <p>Still Life with Teapot Cezanne, Paul, 183...</p>	 <p>Still Life with Teapot and Fruit Gauguin, Paul, 184...</p>	 <p>Two Tea Balls & Teapot Davis, Stuart, 189...</p>

Welcome: jgourley@jhu.edu
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Navigation bar changes

Back link on navigation bar instead of hidden under “Go To” link

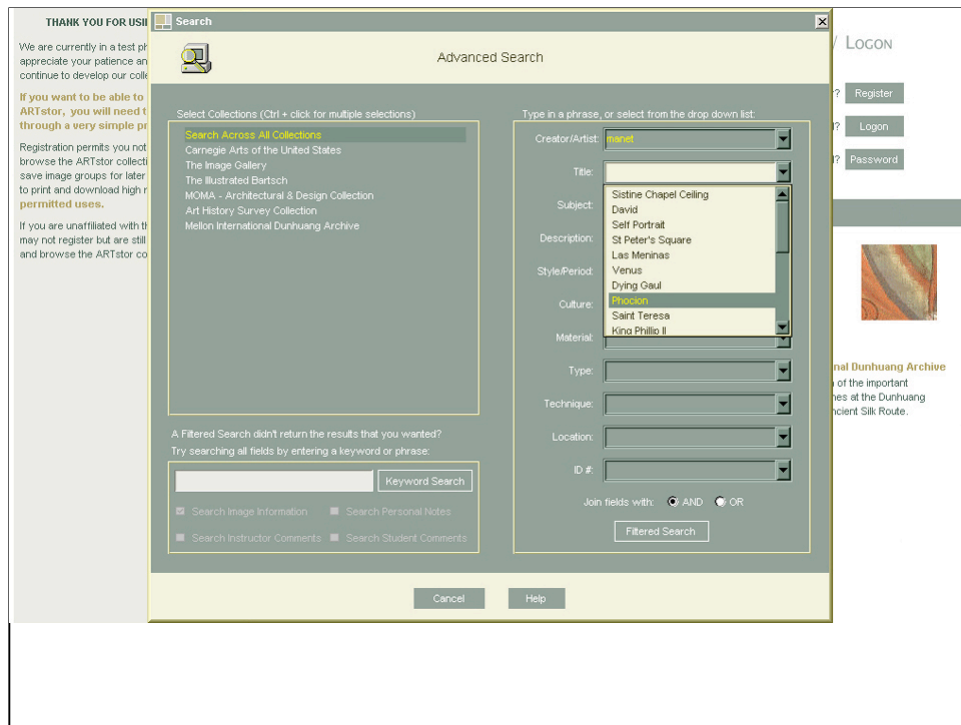
Home link should be more obvious than ARTstor logo as a way to return to Library Homepage

Inactive Save button has been removed; participants thought they could save groups or download images using “Save,” but they could not.

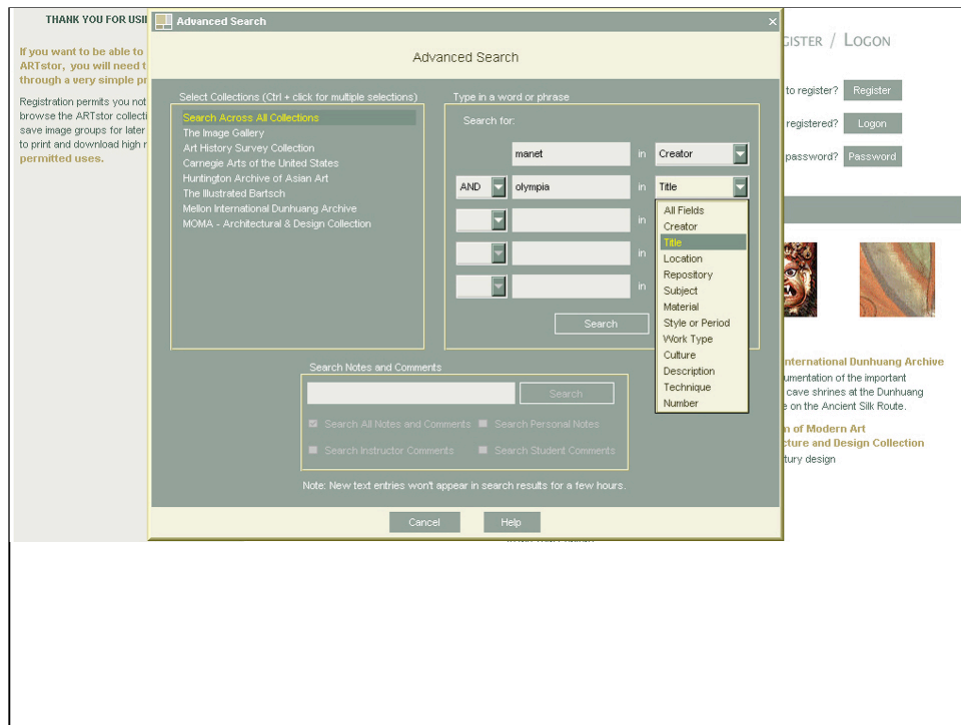
Search could be changed to another collection with added drop-down list of collections, giving the thumbnail page the full functionality of the Library Homepage.

Advanced Search

- Combination text box/drop-down list of prior search terms confused users who thought they need to limit their search terms to the items on the list.
- Type of search is not prompted, which allows greater perceived freedom in search.
- Filtered Search button changed to Search.



This is the original advanced search dialog box. Note the filtered search button. This was a source of confusion to participants because they didn't necessarily know it would initiate the search. Note also the many field options. Some participants thought that they had to fill in as many fields as possible, which led them to perhaps too narrowly limit their search. Most critically, the combination text box/dropdown menus which listed previous search terms, not necessarily those of the current user, proved rather confusing. Participants did not realize that they could type in new terms.



In the new advanced search dialog box, the search button is just 'search' not 'filtered search.'

The type of search is not prompted, which allows greater perceived freedom in search to users.

The combination text box/dropdown menus are gone, along with previous search terms, leaving only text boxes for users to enter their own search terms.

The And/Or/Not dropdown menus are new, enabling users to include and exclude terms.

Help

- Task asked participants to print a help page about truncating a search term.
- Print button added to top navigation.
- Many additional questions and answers added.

ARTSTOR

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?

Getting Started

Overview

Welcome Page

Collection Page

Thumbnail Page

Image Viewer

How do I ...

?

Change the order of images?

?

Search for images?

?

Save images to a group?

?

View an image group as a presenta

?

View side-by-side image compariso

?

Install Flash?

?

Disable pop-up blocking software?

?

Delete an Image Group?

Troubleshooting

?

The Image Viewer does not open w

?

The option to save images to a grou

?

My Personal Folder is not appearing

?

I cannot drag and drop to sort thum

Troubleshooting

The Image Viewer does not open when I double-click a thumbnail.

The option to save images to a group is grayed out.

My Personal Folder is not appearing in the Open Image Group page.

I cannot drag and drop to sort thumbnails.



Print button added to top navigation.

Many additional questions and answers added. While some of these can be attributed to the usability evaluation, many were added as ARTstor received feedback from beta-test institutions, and, since ARTstor's launch this past summer, ARTstor subscribers.

Resources

- Hom, James. "The Usability Methods Toolbox." jthom.best.vwh.net/usability/
- Rubin, Jeffrey. *Handbook of Usability Testing*. 1994.
- Dumas, Joseph & Redish, Janice. *A Practical Guide to Usability Testing*. 1993.

Bonus Example: Library Catalog

JHU Libraries	Basic Keyword	Advanced Keyword	Alphabetical	Help
---------------	---------------	------------------	--------------	------

JHU Catalog Search	Search for keyword(s):
Search History	General Keyword <input type="text"/> GO
Reserves	Limited to: All Libraries All Eisenhower Locations Medical Libraries SAIS Library Friedheim Music Library
Borrower Info/ Book Renewals	
Interlibrary Loan Doc Delivery	
JHU Library Locations	

[Basic Keyword](#) | [Advanced Keyword](#) | [Alphabetical](#) | [Help](#)
Questions or comments to: catalog@library.jhu.edu

Library Catalog after Testing

Welcome to the Johns Hopkins University Libraries Catalog

Please select an option:

Alphabetical

Find items for KNOWN author, title, journal/newspaper title, call number, ISBN, ISSN or other fields.

**Basic
Keyword**

Find items that have your keywords in the author, title, journal/newspaper title, subject heading, etc.

**Advanced
Keyword**

Find items that have your keywords in the author, title, subject heading, etc. Also limit the search by language, location, date, material type, etc.

Reserves

Locate course reserves for Eisenhower, SAIS, and the School of Medicine by Instructor or Course.

**Borrower Info/
Book Renewals**

See a list of your borrowed materials, renew books, register for email notices, view fines, etc.

Inside the catalog, you will find Help screens and additional information on ILL/ Document Delivery, JHU Libraries, etc.

Comments to: catalog@library.jhu.edu

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